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FACILITY DESCRIPTION AND BACKGROUND

The University of California San Diego (UCSD), Scripps Institution of Oceanography (SIO) is located along the Pacific coast in La Jolla, San Diego County. SIO discharges wastes associated with its seawater system pursuant to Order No. 99-83, National Pollutant Discharge Elimination System (NPDES) permit No. CA0107239.

The seawater system has the capacity to pump approximately 1.25 million gallons per day (mgd) of seawater from an intake pump located on the seaward end of Scripps Pier. The seawater is filtered through high-speed sand filters located at the foot of the Scripps Pier. The filtered water is stored in two concrete storage tanks located near the filters. Any overflow water is discharged across the beach near the foot of the pier. The filtered seawater is delivered to the laboratories and aquaria of SIO, the Stephen Birch Aquarium-Museum, and the National Marine Fisheries Service aquaria. After circulation through the various aquaria, the water is discharge back into the ocean at two outfalls, Outfall 001 and Outfall 003. SIO also discharges wastes through two additional outfalls, Outfall 004a and Outfall 004b. Outfalls 004a and 004b discharge seawater overflow (from the intake flume or from the storage tank) and filter backwash water respectively. In 2004 the seawater system discharges from Outfall 002 were eliminated. Outfall 002 discharges municipal storm water. Outfalls 001 and 003 also convey discharges from the municipal storm sewer system in and around the SIO.

The seawater discharges occur in the vicinity of Scripps Pier at approximately 32° 51' 58" North Latitude and 117° 15' 09" West Longitude. The discharges flow across the

beach into the *San Diego Marine Life Refuge*, an area designated by the State Water Resources Control Board (State Board) as an *Area of Special Biological Significance* (ASBS).

The SIO seawater discharge outfalls are described below:

Outfall 001: Outfall 001 discharges an average daily discharge of 0.470 mgd and has a maximum discharge of 0.700 mgd of seawater that has circulated through the following facilities:

- a. Stephen Birch Aquarium,
- b. National Marine Fisheries aquaria, and
- c. Hubbs Hall aquaria.

Intermittent discharges to Outfall 001 occur approximately four to ten times per year from tanks at the Hydraulic Laboratory and from the tanks at the Keck Center for Ocean Atmosphere Research.

Outfall 002: Outfall 002 does not discharge wastewater from the seawater system, but does discharge municipal storm water.

Outfall 003: Outfall 003 discharges an average daily discharge of 0.280 mgd and a maximum discharge of 0.410 mgd from the Experimental Aquarium, and the Ring Tank complex (when the Ring tank is in use).

Outfall 004a and Outfall 004b: Outfall 004a and Outfall 004b discharge an average daily discharge of 0.045 mgd and a maximum discharge of 0.140 mgd. Outfall 004a discharges intake water and settling tank overflow. Outfall 004b discharges backwash water from the sand filter backwash water system.

The four seawater system Outfalls have an average daily combined discharge of 0.795 mgd of seawater system discharges and have a maximum daily combined discharge of 1.25 mgd. The maximum daily combined discharge is based on the seawater intake pump capacity.

BASIS FOR WASTE DISCHARGE REQUIREMENTS

Pursuant to the 2001 Ocean Plan, the discharge of waste to an ASBS is prohibited unless the discharger applies for and receives an exception to the prohibition. The SIO seawater system and storm sewer system discharges are to an ASBS, and since SIO had never applied for or received an exception to discharge wastes to an ASBS, the State Board required SIO to apply for an exception to the Ocean Plan to continue the discharges to the ASBS.

In November 22, 2002, SIO applied to the State Board for an exception to the Ocean Plan to discharge to an ASBS. On July 22, 2004, the State Board adopted Resolution No. 2004-0052, which approved a Mitigated Negative Declaration for an exception for the discharges from the SIO seawater system and for the discharges of municipal storm water to the San Diego Marine Life ASBS.

The Initial Study is attached to this Order. The Initial Study contains detailed information regarding the history of the facility and the discharges from SIO. The reader is directed to the Initial Study for additional information.

This NPDES permit previously allowed an initial dilution factor of 2:1. On February 9, 2007, SIO submitted the results of a dilution study to this Regional Board. The dilution and dispersion of effluent from the five permitted outfalls at SIO into the ASBS were studied using the SEDXPORT hydrodynamic modeling system. The model is designed to numerically simulate dry weather and wet weather case scenarios. The dilution study incorporated historical data on water mass properties (salinity, temperature) tides and waves (water elevation, wave height and direction) that have been collected from Scripps pier since 1980.

The dilution and dispersion study results indicate dilution factors greater than 17:1 occur 95% of the time. The minimum dilution ratio observed was 7:1. Based on the SIO dilution study, this Order establishes effluent limitations for discharges of (1) seawater system discharges and (2) seawater system discharges mixed with storm water using the 7:1 initial dilution factor.

The State Board Resolution required SIO to conduct an initial dilution study. Once the dilution study was completed, this Regional Board evaluated the study and determined it was appropriate to modify the dilution factor.

The 2001 Ocean Plan equation for Table B effluent limitations is listed below:

$$C_e = C_o + D_m(C_o - C_s)$$

where:

C_e = effluent concentration limit, $\mu\text{g/L}$

C_o = the concentration (water quality objective) to be met at the completion of initial dilution, $\mu\text{g/L}$

C_s = background seawater concentration, $\mu\text{g/L}$

D_m = minimum probable initial dilution expressed as parts seawater per part wastewater.

The 2001 Ocean Plan specifies the following background concentrations:

As = 3 µg/L
Cu = 2 µg/L
Hg = 0.0005 µg/L
Ag = 0.16 µg/L
Zn = 8 µg/L
Other Table B constituents = 0 µg/L

An example calculation for DDT using a dilution factor of 7:1 is provided below:

$$C_e = 0.00017 + 7(0.00017 - 0) \quad C_e = 0.00136 \text{ µg/L}$$

An example calculation for Cu using a dilution factor of 7:1 is provided below:

$$C_e = 3 + 7(3 - 2); \quad C_e = 10 \text{ µg/L}$$

This Order includes effluent limitations for the water quality objectives listed in *Table B. Water Quality Objectives* in the 2001 California Ocean Plan. The effluent limitations were initially calculated using a dilution factor of 2:1. In November 2008 this Order was modified and the dilution factor was increased to 7:1. Effluent limitations were recalculated to reflect the change in dilution factor. The seawater system discharges and any storm water discharges mixed with seawater system discharges from Outfall 001, 003, 004a and 004b must comply numerical effluent limitations for the Table B Water Quality Objectives at the discharge point. Compliance with the numerical effluent limitations is required by this Order three years after its adoption. Outfall 001, 003, 004a and 004b must comply with effluent limitations in Table A of the Ocean Plan.

Because the numerical effluent limitations are not effective until three-years after the adoption of this Order, the discharger shall monitor Outfall 001, 003, 004a, and 004b twice quarterly for the first year. The twice quarterly monitoring will provide eight monitoring events in 12 months. This data may provide information for a reasonable potential analysis (RPA) for the respective discharges. After the first year of monitoring, the discharges shall be monitored twice annually.

A RPA was conducted by SIO using the Reasonable Potential Calculator Software (RPcalc, Version 2.0). The RPA calculations were based on 39 discharge samples collected during wet and dry weather between December 2004 and August 2006. Based on the RPA conducted, monitoring for 65 constituents from Outfall 001, 003, 004a, and 004b have been reduced to once during the life of the permit. Monitoring for Table A Constituents will remain unchanged.

The municipal storm water discharges from Outfall 002 must comply with narrative effluent limitations for the Table B Water Quality Objectives at the discharge point. The narrative effluent limitations require the discharger to evaluate and implement best

management practices (BMP) as an iterative processes. The narrative effluent limitations are required for Outfall 002 because it discharges only municipal storm water.

Whenever the analyses of municipal storm water discharges from Outfall 002 exceeds the effluent limitations from the Ocean Plan the discharger shall review its Storm Water Management Plan/Program (SWMP) and modify the SWMP as necessary to reduce the concentrations of those constituents that exceed the effluent limitations. This Order also requires the discharge to sample and analyze the next storm water runoff event for the specific constituents that exceeded the effluent limitations, and compare to previous monitoring data and evaluate for best management practices (BMP) effectiveness and improvement. This Order also requires the discharge to document the review and the modifications to the SWMP, and to document the sampling analysis and comparison.

This Order also requires a one-year period to monitor four discharge events from Outfall 002. The additional monitoring will provide monitoring analysis data to help characterize the quality of the discharge from Outfall 002 and will help to identify potential impacts to the receiving water quality at the ASBS and to develop appropriate best management practices (BMP) for the municipal storm water discharges.

The conditions required by State Board Resolution No. 2004-0052 are listed below and are the basis for conditions in this Order.

1. The discharge must comply with all other applicable provisions, including water quality standards, of the Ocean Plan. Natural water quality conditions in the receiving water, seaward of the surf zone, must not be altered as a result of the discharge. The surf zone is defined as the area between the breaking waves and the shoreline at any one time. Natural water quality will be defined, based on a review of the monitoring data, by an advisory committee composed of State and Regional Board staff, a representative from UCSD/SIO, and two scientists selected by Regional Board staff from some academic organizations other than UCSD/SIO. At a minimum the advisory committee must meet annually to review the monitoring data and to advise the Regional Board whether or not natural water quality is being altered in the ASBS as a result of the UCSD/SIO discharges.
2. UCSD/SIO must minimize concentrations of chemical additives, including antibiotics, in the effluent. Formalin shall not be discharged to the ocean. The use of copper as a treatment additive in the open seawater system must be eliminated as soon as practicable; alternatively the discharge of copper additives must be eliminated as soon as practicable through the treatment of effluent prior to discharge. All additives to the seawater at the Birch Aquarium must be minimized to prevent the alteration of natural water quality conditions in the receiving water. In addition and at a minimum, UCSD/SIO must comply with effluent limits implementing Table B water quality objectives as required in Section III.C. of the Ocean Plan. Furthermore, UCSD/SIO must submit a report to the Regional Board within six months of permit re-issuance evaluating alternatives and associated costs, and the feasibility of such alternatives, to the current discharges to the ASBS. The report must include, but not be limited to, alternatives such as partial or complete diversion to sewer, alternative

treatment techniques, pollutant minimization, and source control to eliminate the discharge of copper, and to reduce the discharge of other antibiotics and treatment additives. The report must also include a discussion of alternatives, associated costs and feasibility of moving the waste seawater outfalls to locations outside of the ASBS.

3. Effluent and receiving water analysis for copper must employ the approved analytical method with the lowest minimum detection limits (currently Inductively Coupled Plasma/Mass Spectrometry).
4. A quarterly report of all chemical additives discharged via waste seawater must be submitted in the quarterly monitoring report to the Regional Board.
5. Flow measurements (using a flow metering device) for Outfall 001, and estimates for all other permitted outfalls, must be made and reported quarterly to the Regional Board.
6. By January 1, 2007, UCSD/SIO must eliminate all discharges of non-storm water urban runoff (i.e., any discharge of urban runoff to a storm drain that is not composed entirely of storm water), except those associated with emergency fire fighting.
7. UCSD/SIO must specifically address the prohibition of non-storm water urban runoff and the reduction of pollutants in storm water discharges draining to the ASBS in a revised Storm Water Management Plan/Program (SWMP). UCSD/SIO is required to submit its revised SWMP to the Regional Board within six months of permit issuance. The SWMP is subject to the approval of the Regional Board.
8. The revised SWMP must include a map of all entry points (known when the SWMP is prepared) for urban runoff entering the UCSD/SIO drainage system. The SWMP must also include a procedure for updating the map and plan when other entry points are discovered.
9. The revised SWMP must describe the measures by which non-storm water discharges will be eliminated and interim measures that will be employed to reduce non-storm water flows until the ultimate measures are implemented.
10. The revised SWMP must also address storm water discharges and how pollutants will be reduced in storm water runoff into the ASBS through the implementation of Best Management Practices (BMPs). The SWMP must describe the BMPs and include an implementation schedule. The implementation schedule must be designed to ensure an improvement in receiving water quality each year (over the permit cycle) due to either a reduction in storm water discharges (due to diversion) or reduction in pollutants (due to on-site treatment or other BMPs). The implementation schedule must be developed to ensure BMPs are implemented within one year of the permit issuance date.
11. Once every permit cycle, a quantitative survey of benthic marine life must be performed. The Regional Board, in consultation with the State Board Division of Water Quality, must

- approve the survey design. The results of the survey must be completed and submitted to the Regional Board within six months before the end of the permit cycle.
12. Once during the upcoming permit cycle, a bioaccumulation study using sand crabs (*Emerita analoga*) and mussels (*Mytilus californianus*) must be conducted to determine the concentrations of metals near field and far field (up and down coast, and offshore) in the ASBS. The Regional Board, in consultation with the Division of Water Quality, must approve the study design. The results of the survey must be completed and submitted to the Regional Board at least six months prior to the end of the permit cycle (permit expiration). Based on the study results, the Regional Board, in consultation with the Division of Water Quality, may limit the bioaccumulation test organisms, required in subsequent permits, to only sand crabs or mussels.
 13. The effluent from Outfall 001 must be sampled and analyzed monthly for copper concentrations. If after UCSD/SIO has demonstrated that copper as a treatment additive has been eliminated from the discharge into the ASBS, the Regional Board in consultation with the State Board Division of Water Quality may reduce the frequency of monitoring for copper in the effluent.
 14. During the first year of the permit cycle, two samples must be collected from Outfall 001 (once during dry weather and once during wet weather) and analyzed for all Ocean Plan Table B constituents. During the first year of the permit cycle, two composite samples must also be collected (once during dry weather and once during wet weather) representing flows from Outfalls 002, 003, 004A, and 004B; these two composite samples must also be analyzed for all Ocean Plan Table B constituents. For wet weather samples from Outfall 001 and for the wet weather composite sample from Outfalls 002, 003, 004A, and 004B, the effluent samples must also be analyzed for Ocean Plan indicator bacteria. Based on these results, the Regional Board will determine the frequency of sampling (at a minimum, annually) and the constituents to be tested during the remainder of the permit cycle, except that chronic toxicity must be tested at least twice annually.
 15. Twice annually, once during dry weather and once during wet weather, the receiving water and sediment in the vicinity of the UCSD/SIO pier must be sampled and analyzed for Ocean Plan Table B constituents. Receiving water must also be monitored for compliance with Ocean Plan bacterial water quality quality objectives. For sediment toxicity testing, only an acute toxicity test using the amphipod *Eohaustorius estuarius* must be performed. All other Table B constituents must be analyzed during the first year. The Regional Board will determine the sample location(s) seaward of the surf zone. Based on the first year sample results, the Regional Board will determine specific constituents to be tested during the remainder of the permit cycle, except that copper and chronic toxicity for water must be tested twice annually, and copper and acute toxicity for sediment must be tested annually.
 16. If the results of receiving water monitoring indicate that wet weather discharges that include storm water are causing or contributing to an alteration of natural water quality in the ASBS, UCSD/SIO is required to submit a report to the Regional Board within 30 days. Those

constituents in storm water that alter natural water quality must be identified in that report. The report must describe BMPs that are currently being implemented, BMPs that are planned for in the SWMP, and additional BMPs that may be added to the SWMP. The report shall include a new or modified implementation schedule. The Regional Board may require modifications to the report. Within 30 days following approval of the report by the Regional Board, UCSD/SIO must revise its SWMP to incorporate any new or modified BMPs that have been and will be implemented, the implementation schedule, and any additional monitoring required. Implementation of non-structural BMPs must be within one year of the approval by the Regional Board of the revised SWMP. Structural BMPs must be implemented as soon as practicable. As long as UCSD/SIO has complied with the procedures described above and is implementing the revised SWMP, then UCSD/SIO does not have to repeat the same procedure for continuing or recurring exceedances of the same constituent.

17. A study must be performed to determine the initial dilution and fate of the discharge during storms (larger waves and lower salinity discharge) and non-storm periods (smaller waves and higher salinity discharge). The study may be empirical (e.g., a dye study) and/or using a model.
18. In addition to the bacterial monitoring requirements in the Ocean Plan, indicator bacteria and total residual chlorine must be tested once monthly in the effluent from Outfall 003, draining the marine mammal holding facility, when in use.
19. UCSD/SIO must develop and implement administrative and/or engineering controls that result in a negligible risk of the release of exotic species, including foreign pathogens (parasites, protozoa, bacteria, and viruses).

NPDES Rating, Threat to Water Quality and Complexity Rating, and Flow Rating

Pursuant to the *NPDES Permit Rating Worksheet*, the discharge from the SIO facility and appurtenances has a point score of 92 and is classified as a *Major Facility*. The regulatory requirements and conditions to allow a discharge to an ASBS cause this Order and the compliance with this Order to be significantly complex.

The maximum reported discharge flow rates for SIO is 1.25 mgd based on the intake pump capacity. There are five discharge points regulated by this Order and approximately 93 total municipal storm water discharge points (however, the 93 total discharge points may contain a significant number of pressure relief weep holes for the sea walls at SIO). The Threat to Water Quality and Complexity (TTWQ/CPLX) rating for this facility is 2/A.

Public Hearing

Order No. R9-2005-0008 will be considered by the San Diego Regional Board at a public hearing on:

Wednesday, February 9, 2005 beginning at 09:00

at the following location:

**Water Quality Control Board
Regional Board Meeting Room
9174 Sky Park Court
San Diego, California**

Revisions/Modifications for Order No. R9-2005-0008 will be considered by the San Diego Regional Board at a public hearing on:

Wednesday, November 12, 2008 beginning at 09:00

at the following location:

**Water Quality Control Board
Regional Board Meeting Room
9174 Sky Park Court
San Diego, California**

Review of Order No. R9-2005-0008

Copies of the Order and other documents (other than those that the Executive Officer maintains as confidential) are available at the Regional Board office for inspection and copying according to the following schedule (except holidays):

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|------------------------|---|
| Monday and Thursday: | 1:30 p.m. to 4:30 p.m. |
| Tuesday and Wednesday: | 8:30 a.m. to 11:30 a.m. and 1:30 p.m. to 4:30 p.m. |
| Friday: | 8:30 a.m. to 11:30 a.m. |

An electronic copy of the Fact Sheet and Order can be accessed on the Regional Board website at <http://www.waterboards.ca.gov/sandiego>

Additional Information

For additional information regarding WDR No. R9-2005-0008, interested persons may write to the following address or call Mr. Paul J. Richter of the Regional Board staff at (858) 627-3929 or by e-mail at prichter@waterboards.ca.gov.

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